Advances in Aircraft Structures

Editor

Jaffar Syed Mohamed Ali

Erwin Sulaema

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

ISBN: 978-967-418-148-2

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

CONTENTS

Structural Instability

Structure Analytical Methods

Chapter 18
Characterization of Composite Materials using Full Field Data

Syed Muhammad Kashif

Abstract

Characterization of anisotropic materials and particularly composite materials requires great number of experiments for a complete characterization and identification of all the directional constitutive properties. Lately due to the technological advancements in optical measurements and computational resources, new methods have been proposed based on full field data measured on the surface of a test specimen. On one hand a good quality optical device is required to capture the image of the specimen, whereas on the other hand, sufficient computational resource is required to exploit the rich data captured by a high resolution digital camera. This chapter discusses the issues related to the use of such full filed data for the characterization of composite or complete anisotropic materials.

***Keywords**: Composites, constitutive properties, full field data, optical methods, direct solution, inverse methods.*

1. Introduction

The non-contact full-field measurements techniques are becoming more and more popular in the experimental mechanics community thanks to recent developments in image processing techniques using CCD cameras and powerful computers. Various techniques are available in practice such as digital image correlation